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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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EXAMINER

ART UNIT	PAPER NUMBER
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DATE MAILED:

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/654,776

Applicant(s)

HSIEH ET AL.

Examiner

Steven Loke

Art Unit

2811

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 05 September 2000.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) 29-35 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 29-35 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s) ____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3 6) ☐ Other _____

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The disclosure is objected to because of the following informalities:

What is reference numeral [140] in fig. 2e?

Appropriate correction is required.

Claim 29 is objected to because of the following informalities:

In claim 29, line 10, "ONO" should be in full form; line 10, "said substrate" has no antecedent basis. Appropriate correction is required.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 29-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Doan et al. in view of Hsu et al.

In regards to claim 29, Doan et al. discloses a stacked-gate flash memory in figs. 2A-3. It comprises: a trench with a high-step oxide [42]; an opening adjacent to the trench with the high-step oxide; a first polysilicon layer [46] conformally lining the opening including the high-step oxide of the trench to form a floating gate; an oxide layer [48] covering the first polysilicon layer including walls of the floating gate lining the opening; a second polysilicon layer [54] covering the oxide layer to form a control gate.

It would have been obvious to have a conformal layer lining the inside walls of the trench because it isolates the memory cell from the other memory cell.

It would have been obvious to have a self-aligned source line because it is a conventional structure in a flash memory array.

Doan et al. differs from the claimed invention by not showing an oxide-nitride-oxide layer between the floating gate and the control gate.

Hsu et al. shows an oxide-nitride-oxide layer [700] formed between the floating gate [500A] and the control gate [710] in fig. 11A.

Since both Doan et al. and Hsu et al. teach a floating gate formed in an opening, it would have been obvious to have the oxide-nitride-oxide layer of Hsu et al. in Doan et al. because it is a conventional insulation material between the floating gate and the control gate.

In regards to claim 30, it would have been obvious for the trench with a high-step oxide has a depth between about 2500 to 5000 angstrom because it depends on the memory cell density in the substrate.

In regards to claim 31, it would have been obvious for the high-step oxide above the trench has a height between about 2000 to 6000 angstrom because it depends on the memory cell density in the substrate.

In regards to claim 32, it would have been obvious for the conformal lining layer comprises oxide having a thickness between about 2500 to 5000 angstrom because it depends on the memory cell density in the substrate.

In regards to claim 33, it would have been obvious for the opening has a width between about 1500 to 5000 angstrom because it depends on the memory cell density in the substrate.

In regards to claim 34, it would have been obvious for the first polysilicon layer has a thickness between about 100 to 500 angstrom because it depends on the memory cell density in the substrate.

In regards to claim 35, it would have been obvious for the second polysilicon layer has a thickness between about 1000 to 3000 angstrom because it depends on the memory cell density in the substrate.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven Loke whose telephone number is (703) 308-4920. The examiner can normally be reached on 7:45 am to 5:15 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (703) 308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

sl
September 30, 2001

Steven Loke